

What is claimed is:

1           1.     A cooling device with a micro cooling fin, the cooling device  
2 comprising:  
3           a substrate; and  
4           a plurality of vibrating type cooling fins extending from the substrate.

1           2.     The cooling device of claim 1, wherein the substrate is a  
2 semiconductor substrate.

1           3.     The cooling device of claim 1 or 2, wherein each of the vibrating type  
2 cooling fins extends in parallel to the surface of the substrate.

1           4.     The cooling device of claim 1 or 2, wherein each of the vibrating type  
2 cooling fins extends upward from the substrate at an angle.

1           5.     The cooling device of claim 1 or 2, wherein each of the vibrating type  
2 cooling fins has a resonance frequency corresponding to the flow rate of the air  
3 flowing over the substrate.

1           6.     The cooling device of claim 3, wherein each of the vibrating type  
2 cooling fins has a resonance frequency corresponding to the flow rate of the air  
3 flowing over the substrate.

1           7.     The cooling device of claim 4, wherein each of the vibrating type  
2 cooling fins has a resonance frequency corresponding to the flow rate of the air  
3 flowing over the substrate.

1           8.     The cooling device of any one of claims 1, 2, 6 and 7, wherein a  
2 coating layer for giving stress to the surface of each of the vibrating type cooling fins  
3 is formed on the surface of the vibrating type cooling fins.

1           9.     The cooling device of claim 3, wherein a coating layer for giving stress  
2 to the surface of each of the vibrating type cooling fins is formed on the surface of  
3 the vibrating type cooling fins.

1           10.    The cooling device of claim 4, wherein a coating layer for giving stress  
2 to the surface of each of the vibrating type cooling fins is formed on the surface of  
3 the vibrating type cooling fins.

1           11.    The cooling device of claim 5, wherein a coating layer for giving stress  
2 to the surface of each of the vibrating type cooling fins is formed on the surface of  
3 the vibrating type cooling fins.

1           12.    A cooling device with a micro cooling fin, the cooling device  
2 comprising:  
3       a substrate;  
4       a plurality of vibrating type cooling fins extending from the substrate; and  
5       a blast fan for ventilating the substrate to cool the substrate and the vibrating  
6 type cooling fins and for causing the vibrating type cooling fins to vibrate.

1           13.    The cooling device of claim 12, wherein the substrate is a  
2 semiconductor substrate.

1           14.    The cooling device of claim 12 or 13, wherein each of the vibrating  
2 type cooling fins extends in parallel to the surface of the substrate.

1           15.    The cooling device of claim 12 or 13, wherein each of the vibrating  
2 type cooling fins extends upward from the substrate at an angle.

1           16.    The cooling device of claim 12 or 13, wherein each of the vibrating  
2 type cooling fins has a resonance frequency corresponding to the flow rate of the air  
3 flowing over the substrate.

1 17. The cooling device of claim 14, wherein each of the vibrating type  
2 cooling fins has a resonance frequency corresponding to the flow rate of the air  
3 flowing over the substrate.

1 18. The cooling device of claim 15, wherein each of the vibrating type  
2 cooling fins has a resonance frequency corresponding to the flow rate of the air  
3 flowing over the substrate.

1 19. The cooling device of any one of claims 12, 13, 17 and 18, wherein a  
2 coating layer for giving stress to the surface of each of the vibrating type cooling fins  
3 is formed on the surface of the vibrating type cooling fins.

1 20. The cooling device of claim 14, wherein a coating layer for giving  
2 stress to the surface of each of the vibrating type cooling fins is formed on the  
3 surface of the vibrating type cooling fins.

1 21. The cooling device of claim 15, wherein a coating layer for giving  
2 stress to the surface of each of the vibrating type cooling fins is formed on the  
3 surface of the vibrating type cooling fins.

1 22. The cooling device of claim 16, wherein a coating layer for giving  
2 stress to the surface of each of the vibrating type cooling fins is formed on the  
3 surface of the vibrating type cooling fins.